



17416

Patent
261/136
P96-0015US2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Eric J. Bergman

Serial No.: 09/811,925

Filed: March 19, 2001

For: Methods for Cleaning Semiconductor Surfaces

)
) **Group Art Unit: 1746**
)

) **Examiner: Z. El-Arini**
)
)
)

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STATEMENT OF RELATED APPLICATION

Commissioner for Patents
Washington, D.C. 20231

Sir:

A related application, Serial No. 09/836,059, filed April 16, 2001, Inventor Eric J. Bergman, is pending in Art Unit 1746, Examiner Z. El-Arini. Another related application, Serial No. 09/836,080 filed April 16, 2001 is pending. The pending claims and Office Action mailed July 16, 2001 in Serial No. 09/836,059 and pending claims in Serial No. 09/836,080 are enclosed.

Respectfully submitted,
LYON & LYON LLP

Dated: Oct. 15, 2001

By: Kenneth H. Ohriner
Kenneth H. Ohriner
Reg. No. 31,646

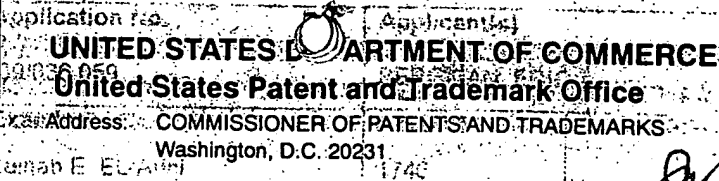
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(37 C.F.R. §1.8a)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as First Class Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

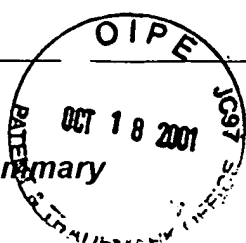
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Laura Murphy
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Office Action Summary



Application No.

09/836,059

Applicant(s)

BERGMAN, ERIC J.

Examiner

Zeinab E. EL-Arini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 2, claim 7, line 6, " the surface" lacks antecedent basis. At line 7, " the surface of the water" lacks antecedent basis.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Matthews (5,464,480).

Matthews teaches a process for removing organic material from semiconductor wafers. The process comprises contacting the wafers with a solution of ozone and water, and rinsing the wafer with deionized water. See the abstract, the claims, col. 5, lines 42-55, col. 10, lines 47-62, and the document in general.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohmi et al. (5,487,398).

Ohmi et al. teach a method for cleaning a surface as claimed. See col. 6, lines 40-45, col. 8, lines 41-50, col. 10, lines 47-55, col. 9, lines 32-45, and the document in general.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Lampert et al. (5,181,985).

Lampert et al. teach a process for cleaning semiconductor wafers as claimed.

See the document in general.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Fukazawa et al. (5,810,940).

Fukazawa et al. teach a method for cleaning a semiconductor wafer. See the abstract, col. 3, lines 48-50, col. 4, lines 10-15, lines 21-62, and the document in general.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews or Ohmi et al. or Fukazawa et al. in combination with Schellenberger et al..

Matthews and Ohmi et al. and Fukazawa et al. as discussed supra do not teach mixing the ozone with the carrier gas as claimed.

Schellenberger et al. teach a procedure for the drying of silicon. The reference teaches that the gas mixture added over the surface of the hydrofluoric acid solution contains oxygen / ozone, and nitrogen or similar gas can be used as a carrier gas. See col. 3, lines 3-9, lines 25-36, col. 4, lines 10-15, 24-25, and the document in general.

It would have been obvious at the time applicant invented the claimed process to use the carrier gas taught by Schellenberger et al. in the Matthews or Ohmi et al. or Fukazawa et al. process to obtain the claimed process. This is because mixing the ozone with the carrier gas is well known in the semiconductor processing art.

10. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews or Fukazawa et al. in combination with Ohmi et al.

Matthews and Fukazawa et al. as discussed supra do not teach the rotating step as claimed.

Ohmi et al. teach the rotating step as claimed.

It would have been obvious for one skilled in the art to use the rotating step taught by Ohmi et al. in the Matthews or Fukazawa et al to improve the cleaning process. This is also because rotating the semiconductor surfaces during cleaning is well known in the art.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1-13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 98-102, 104—105, and 107-116 of copending Application No. 09/811,925. Although the conflicting claims are not identical, they are not patentably distinct from each other because the process as claimed in both applications are functionally equivalent.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeinab E. EL-Arini whose telephone number is (703) 308-3320. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-7719 for regular communications and (703)305-7719 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Zeinab El-Arini

Zeinab E. EL-Arini
Primary Examiner
Art Unit 1746

ZEE
July 13, 2001

Notice of References Cited

Application/Control No.

09/836,059

Applicant(s)/Patent Under
Reexamination
BERGMAN, ERIC J.

Examiner

Zeinab E. EL-Arini

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U.S. PATENT DOCUMENTS

*		Document Number	Date	Name	Classification	
		Country Code-Number-Kind Code	MM-YYYY			
	A	US-5,810,940	09-1998	Fukazawa et al.	134	3
	B	US-5,714,203	02-1998	Schellenberger et al.	427	378
	C	US-5,487,398	01-1996	Ohmi et al.	134	95.1
	D	US-5,464,480	11-1995	Matthews	134	1.3
	E	US-5,181,985	01-1993	Lampert et al.	156	635
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number	Date	Country	Name	Classification	
		Country Code-Number-Kind Code	MM-YYYY				
	N						
	O						
	P						
	Q						
	R						
	S						
	T						

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



Clean Version of Pending Claims

10/15/01

263/273
P96-0015US4
PATENT

S/N 09/836,059

1. (Amended) A method for cleaning semiconductor articles having an organic coating on a surface thereof comprising:
 - (a) contacting the organic coating on the surface of the article with an aqueous solution and with ozone in an amount sufficient to create an oxidizing effect to oxidize the organic coating; and
 - (d) removing the oxidized coating from the surface of the article. ✓
2. A method as defined in claim 1 wherein the aqueous solution is water. ✓
3. A method as defined in claim 1 wherein the aqueous solution contains an acid. ✓
4. (Amended) A method as defined in claim 1 wherein the aqueous solution is sprayed onto the surface of the article to form a thin aqueous film thereon.
5. A method as defined in claim 1 wherein the aqueous solution is adjusted to a temperature sufficient to effect oxidation on the surface of the wafer.
6. A method as defined in claim 1 wherein the ozone is admixed with a carrier gas.

7. (Amended) A method for cleaning a photo resist coating from a surface of a semiconductor article comprising:

(a) rotating the article in a processing chamber;

(b) spraying the article with an aqueous solution and simultaneously contacting the wafer with ozone in an amount sufficient to oxidize the photo resist on the surface of the wafer; and

(e) removing the oxidized photo resist from the surface of the wafer.

8. A method as defined in claim 7 wherein the aqueous solution is water.

9. A method as defined in claim 7 wherein the aqueous solution contains an acid.

10. (Amended) A method as defined in claim 7 wherein the aqueous solution is sprayed onto the surface of the article to form a thin aqueous film thereon.

11. (Amended) A method as defined in claim 7 wherein the aqueous solution is adjusted to a temperature sufficient to effect oxidation on the surface of the article.

12. A method as defined in claim 7 wherein the ozone is injected into the processing chamber.

13. A method as defined in claim 7 wherein the ozone is admixed with a carrier gas.

14. (New) A method for cleaning a semiconductor article having an organic coating on a surface thereof comprising:
- placing the article into a processing chamber;
 - spraying the surface of the article with an aqueous solution to rinse the surface of the article, while simultaneously contacting the surface of the article with ozone in an amount sufficient to oxidize the organic coating;
 - removing the oxidized organic coating from the surface of the article; and
 - removing the article from the processing chamber without performing a separate rinsing step.
15. (New) A method as defined in claim 14 further comprising the step of rotating the article in the processing chamber during the spraying steps.
16. (New) A method as defined in claim 14 wherein the aqueous solution and the ozone are sprayed onto the surface of the article in solution form.
17. (New) A method as defined in claim 14 wherein the ozone is admixed with a carrier gas.
18. (New) A method as defined in claim 14 wherein the aqueous solution is sprayed onto the surface of the article to form a thin aqueous film thereon.

19. (New) A method as defined in claim 14 wherein the aqueous solution is adjusted to a temperature between 30° C to 130° C.
20. (New) A method as defined in claim 14 wherein the aqueous solution is adjusted to a temperature between 50° C and 90° C.
21. (New) A method for cleaning a semiconductor article in a processing chamber, with the article having an organic coating on a surface thereof, comprising:
- spraying the surface of the article with a solution of ozone and water in an amount sufficient to oxidize the organic coating and to rinse the surface of the article; and
 - removing the oxidized organic coating from the surface of the article.
22. (New) A method as defined in claim 21 wherein the step of removing the organic coating comprises exposing the article to a vapor.
23. (New) A method as defined in claim 21 further comprising the step of removing the article from the processing chamber without performing a separate rinsing step.
24. (New) A method as defined in claim 21 further comprising the step of rotating the article in the processing chamber during the spraying step.
25. (New) A method as defined in claim 21 wherein the solution of ozone and water is admixed with a carrier gas.

26. (New) A method for cleaning a semiconductor article having an organic coating on a surface of the article, comprising the steps of:
- (a) spraying the surface of the article with an aqueous solution;
 - (b) simultaneously providing ozone gas around the surface of the article in an amount sufficient to oxidize the organic coating; and
 - (c) removing the oxidized coating from the surface of the article.